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EXTENT OF DIVERSIFICATION IN WESTERN ZONE OF TAMIL NADU

SATHYAPRIYA ESWARAN[1] & ASOKHAN MURUGAN[2]

[1]*Research Scholar, Department of Agricultural Extension and Rural Sociology, Coimbatore, Tamil Nadu, India*

[2]*Deputy Registrar, Agricultural University, Coimbatore, Tamil Nadu, India*

ABSTRACT

Agricultural diversification can be viewed as a risk management strategy. Tamil Nadu is one among the leading states in the production of principal crops like paddy and sugarcane. The state has witnessed deceleration from the 1990s onwards since the growth in agriculture faced major constraints such as growing water scarcity, urbanization, land degradation, declining farm sizes, and rise in the cost of labour and transition from traditional crops to commercial crops. Hence, an attempt was made to analyse the diversification level in the Western Zone of Tamil Nadu. Herfindahl index and the Simpson index was used for measuring diversification. The major findings of the study was discussed under irrigated area and unirrigated area wise. In irrigated area the diversification index varies from 0.62(Coimbatore, 2010-11) to 0.17 (Erode, 2015-16) and also in the unirrigated area index values ranges from 0.42 (Tirupur, 2014-15) to 0.25 (Erode, 2013-14).

KEYWORDS: Agriculture, Diversification, Irrigated Area, Unirrigated Area, Herfindahl Index & Simpson Index

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INTRODUCTION

Climatic variation causesadverse effects on agriculture. Hence, the farmers struggled in crop cultivation and get poor income. In this circumstance, agricultural diversification can be viewed as a risk management strategy.

Diversification shows a change in the product (or enterprise) choice and input use decisions based on market forces and the principles of profit maximization (Pingali and Rosegrant, 1995). The diversifications may be occurred either by crop wise, livestock component-wise or off -farm diversification. Crop diversification is intended to give a wider choice in the production of a variety of crops in a given area so as to expand production related activities on various crops and also to lessen risk. Livestock diversification is intended to give a wider choice to include livestock stock components in their regular farm practices. It might be given a substantial income to the farmers and also reduce economic burdens. Off-farm diversification means people left agriculture and move towards non- agricultural jobs. Therefore the farmers inclined to fewer risks.

Tamil Nadu is one among the leading states in the production of principal crops like paddy and sugarcane. With the limited gross area sown, the higher productivity of many crops has been achieved by practicing intensive farming. But the state has witnessed deceleration from the 1990s onwards since the growth in agriculture faced major constraints such as growing water scarcity, urbanization, land degradation, declining farm sizes, and rise in the cost of labour and transition from traditional crops to commercial crops.

Hence, an attempt was made to analyse the diversification level in the Western Zone of Tamil Nadu by using Secondary data.

Padmanaban and Chinnadurai (1994) stated that the gross cropped area of Tamil Nadu had been declining from 1960-61 to 1988-89. It was pronounced in a reduction of area in the cereals and cotton. However, the area under pulses, sugarcane, banana, coconut and groundnut had increased.

Studies on crop diversification were also conducted in selected districts of Tamil Nadu (Ajjan and Selvaraj, 1996). This evidenceshowed that there has been a significant change in the cropping pattern and a shift from a low-value subsistence crop to high-valuemarket-oriented crops.

Velavan and Balaji (2012) reported that crop diversification index value has reduced over the years. He further reportedthat major crops like paddy, groundnut andjowar had grown negatively and least share crops like maize, sugarcane, coconut and green gram had grown positively over the years.

Sathyapriya and RexlinSelvin (2016) found that crops having the major shares like paddy and groundnut have grown negatively, and the crops like pulses, maize, fruits, coconut, vegetables grown positively over the years.

METHODOLOGY

The study was undertaken with the main objective of studying the extent of diversification in the irrigated and unirrigated area at the western zone of Tamil Nadu. In Tamil Nadu, the diversification in crop cultivation is more prominently seen in the western zone, so the study was conducted at western zone purposively.

Among the districts in the western zone, Coimbatore, Erode and Tirupur were purposively selected because, the districts had more cultivable area under agriculture than the other districts and also several industries establishments related with automobiles, water pumps, electrical and electronic accessories, textiles and spinning mills were providing enormous employment opportunities to the rural people living in and around the adjoining areas with remunerative income. Hence, considering the above factors the present study will be conducted in the selected districts.

The secondary data needed for the study has been collected from the State Department of Agriculture Office, Tamil Nadu. The area under irrigated crop cultivation and unirrigated crop cultivation of the selected districts for past one decade from 2006 -2016 was considered for diversification analysis. To calculate the extent of diversification in these districts the following tools are used,

Herfindahl Index

Herfindahl index is used in the study to measure diversification. Herfindahl index is the sum of the squares of the acreage proportion of each crop in the total cropped area. That is

$$HI = \sum_{i=1}^{i=N} Pi^2$$

Where, p_i is the share of each crop defined as,

$P_{i} = A/ \quad \sum_{i=1}^{n} Ai$

Here, Ai is acreage of the area under each crop; $\sum_{i=1}^{n} Ai$ is total acreage of area and the value of H ranges from 0 to 1.

Simpson Index

Simpson Index of Diversity (SID) is used to capture the extent of diversification in the study area. SID is calculated using the formulae

$$\mathbf{SID = 1- \sum P_i^2}$$

Where i = 1, 2…..n. and P_i is the proportional value (or area) of the i^{th} crop in the total value (area) of output. When SID is close to one it implies that the diversification increases and when SID is close to zero, there is no diversification.

Classification of Diversification Range

Table 1

S. No	HI Range	Category
1.	0 - 0.25	Complete
2.	0.26 – 0.49	Moderate
3.	0.5 – 0.75	Slight
4.	0.76 – 1.00	Partial

RESULTS AND DISCUSSIONS

This part deals with the extent of diversification in the selected districts in the western zone of Tamil Nadu. Diversification defined as a movement of people from one activity to other remunerative activities.

The collected data was compiled based on irrigated and unirrigated area and analysed by using the diversification index tools and tabulated.

Irrigated Area Wise Extent of Diversification

Here deals with the level of diversification among the irrigated respondents over the period of time and the reasons behind the respondent's occupational change.

Table 2: Extent of Diversification under the Total Irrigated Area

S. No	Year	Coimbatore		Erode		Tirupur	
		HI	SI	HI	SI	HI	SI
1.	2006 – 07	0.50	0.50	0.20	0.80	0.28	0.72
2.	2007– 08	0.50	0.50	0.21	0.79	0.28	0.72
3.	2008– 09	0.36	0.64	0.19	0.81	0.27	0.73
4.	2009– 10	0.40	0.60	0.19	0.81	0.28	0.72
5.	2010– 11	0.62	0.38	0.19	0.81	0.29	0.71
6.	2011– 12	0.55	0.45	0.20	0.80	0.28	0.72
7.	2012– 13	0.55	0.45	0.20	0.80	0.41	0.59
8.	2013– 14	0.57	0.43	0.18	0.82	0.34	0.66
9.	2014– 15	0.57	0.43	0.19	0.81	0.40	0.60
10.	2015– 16	0.58	0.42	0.17	0.83	0.33	0.67

Table 1 shows that in the western zone, the Herfindahl index varies from 0.62(Coimbatore, 2010-11) to 0.17 (Erode, 2015-16). Compared to all those districts the maximum diversification exist in Erode district followed by Tirupur and Coimbatore district. Similarly, Simpson index also strengthens the result. The overall climate variation might be the influencing factor for this type of variation.

According to Coimbatore district, the Herfindahl index value ranges from 0.50 to 0.58 over the time period, it shows that slight diversification takes place. Also, the Simpson index value ranges from 0.50 to 0.42, shows that slight diversification took place in the selected region. In the irrigated area, Coimbatore district had moderate water table level and adequate canal irrigation. Hence, the farmers not perceived as much water scarcity issues and also the respondents can't observe higher risk in agriculture. These might be the reasons behind for slight diversification.

From the result noticed that, past ten years from 2006 – 2016, the fasali year 2008-09 and 2009-10 had the least diversification index value of 0.36 and 0.40 respectively, that means the particular years the irrigated area under crop cultivation was declined, it might be due to the low rainfall distribution in the concerned time period. As well the succeeding years had increased index value, which means the area compensated by the same or other irrigated crop cultivation.

Coimbatore has been the highest area under coconut cultivation, due to the fact the farmers not easily move to other crops. As well as coconut is one of the highest remunerated commercial crops and less risk-oriented. The climatic condition, new pest emergence and health status would be influenced to slight diversification among the irrigated respondents. The irrigated area was compensated by constructions and non-agricultural oriented business ventures this would be the reason for slight diversification.

With respect to Erode district, the Herfindahl Index value ranges between 0.20 – 0.17, it indicates that the complete diversification took place. The Simpson index value (0.8 – 0.83) also proved that the region took complete diversification rather specialization. It might be due to the fact that employment opportunities in the nearby area attracted the respondents and pushed to left agriculture.

From the result noticed that past ten years from 2006 – 2016, the fasali year 2015-16 had the least diversification index value of 0.17. It indicated that the current year faced more irrigated area reduction than the other years. This might be due to the fact that the farmers were unable to cultivate irrigated crops during 2015-16, due to less discharge of water from the lower Bhavani channel (LBP).

In Erode district irrigated areas depends only on canal irrigation as the main source of irrigation instead of other irrigation sources. Thus, the farmers were moved towards climate resilient high-value crops and some extent the respondents left the farming and settled in white and blue collar jobs. This is the reasons for the irrigated area reduction in that region over the period of time.

In Tirupur district, the index value ranges from 0.28 -0.31, it indicates that the complete diversification takes place. The Simpson value ranges between 0.72 – 0.67, this also supports the Herfindahl index result. From the result noticed that the complete diversification took place in the selected region over the time period. It might be due to the fact that the continuous long spell of droughts might influence the farmers to left agriculture.

From the result noticed that past ten years from 2006 – 2016, the fasali year 2008-09 had the least diversification index value of 0.27. The result revealed that the concerned year (2008-09) shown declined area under irrigated crops. The respondents perceived adverse effect due to climate change, then the respondents joined other non-agriculture operations and acted as a part-time farmer. This is the reasons for the agricultural area reduction in the irrigated region.

Crop failure due to insufficient rainfall, less price rate, market failure, labour scarcity and high wages might be the contributing factors for the irrigated area reduction. An industrialestablishment in and around the district would attract the

farmers and influenced the respondents to leave farming. Hence, the respondents either quite the agriculture or involved in part-time agriculture work.

Extent of Diversification - Unirrigated Area Wise

This part deals with the unirrigated area wise diversification range and the reasons may influence the respondents to make such type of decisions**.**

Table 3: Extent of Diversification under the Total Unirrigated Area

S. No	Year	Coimbatore		Erode		Tiruppur	
		HI	SI	HI	SI	HI	SI
1.	2006 – 07	0.38	0.62	0.36	0.64	0.39	0.61
2.	2007– 08	0.32	0.68	0.35	0.65	0.38	0.62
3.	2008– 09	0.37	0.63	0.34	0.66	0.38	0.62
4.	2009– 10	0.32	0.68	0.31	0.69	0.31	0.69
5.	2010– 11	0.31	0.69	0.28	0.72	0.38	0.62
6.	2011– 12	0.32	0.68	0.29	0.71	0.38	0.62
7.	2012– 13	0.36	0.64	0.29	0.71	0.32	0.68
8.	2013– 14	0.38	0.62	0.25	0.75	0.40	0.60
9.	2014– 15	0.41	0.59	0.29	0.71	0.42	0.58
10.	2015– 16	0.32	0.68	0.28	0.72	0.38	0.62

From Table 2, index values ranges from 0.42 (Tirupur, 2014-15) to 0.25 (Erode, 2013-14). This might be due to the fact that in unirrigated farmers solely depends on rainfall for crop cultivation. Based on the corresponding year rainfall the respondents follow either crop cultivation or move to other remunerative occupation. From the result, both the index value represent there is diversification take place in the selected region.

According to Coimbatore district, the index ranges from 0.38 – 0.42, this indicates that moderate diversification takes place. The findings strengthened by Simpson index value (0.62 -0.68). From the decadal analysis result, the fasali year 2010-11 had the least index value (0.31). However, there was very fewer differences exist when compared with the index value of other years.

This might be due to the fact that Coimbatore received both South West and North East rainfall, as a result, the farmers select and cultivate the crops based on rainfall amount not related to high remuneration. In this case, the farmers not satisfied their family needs with the less income, hence, the respondents were moving towards other high income-oriented activity. In some cases the farmer's interested in doing high remunerated business but unable to do because of aging. Then the respondents continuing the farming without interest. One notable issue in that area was due to the price fluctuation and higher risk, the youngsters were not shown interest in farming and this would be the reason for either land sale or leased out and go for less risky jobs and business. These were all the reasons for the moderate level of diversification in the selected region.

With respect to Erode district the index ranges from 0.36 to 0.28, this indicates that there is moderate to complete diversification take place over the period of time. The Simpson index value (0.64 – 0.72) showed the same result. Over the period (2006 - 2016) of time, the fasali year 2013 -14 had a least diversification index value i.e., 0.25. That means the particular region diversified either crop wise or occupational wise.

Erode one of the districts which has agriculture as the main occupation. But over the period of time, the scenario was changing, because of climatic variation, new pest and disease emergence, market failure and high risk ofan agriculture

operation. Besides, youngsters were not involved in farming because of poor interest on risk, consequently influenced the family to shift from farming to other less risky jobs. These were the major reasons for the diversification result of past one decade.

According to Tirupur district, the index ranges from 0.39 – 0.38, and the Simpson index value ranges between 0.61 – 0.62, this indicates that there is moderate diversification take place over the period time.

In this area, industries pull the farmers to the work environment by providing affordable services. This might be influenced the farmers to leave the full-time farmer strategy to mixed strategies. Less remuneration, variation in seasonal rainfall, pest and disease outbreak and lack of market avenues and infrastructure facility were would be the reasons for farmers pushed from farming.

CONCLUSIONS

In general, from the overall result, it could be concluded that in the irrigated area having slight to complete diversification and the unirrigated area having moderate diversification over the period of time. The reasons such as climatic variation, market price fluctuation, insufficient storage facility, pest and disease problem, higher family expenditure, social status, health status and aging of farmers might have influenced such type of change. Though diversifications reduce the risk at the farm level, it would discourage the specialization.

For overcoming these issues the policy makers may concentrate and implement on appropriate area wise farming strategy development based on nature and extent of diversification, providing enormous support to overcome the agricultural risk, attracting the people by providing affordable services and schemes and convert a people mindset to agriculture as a remunerative business.

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